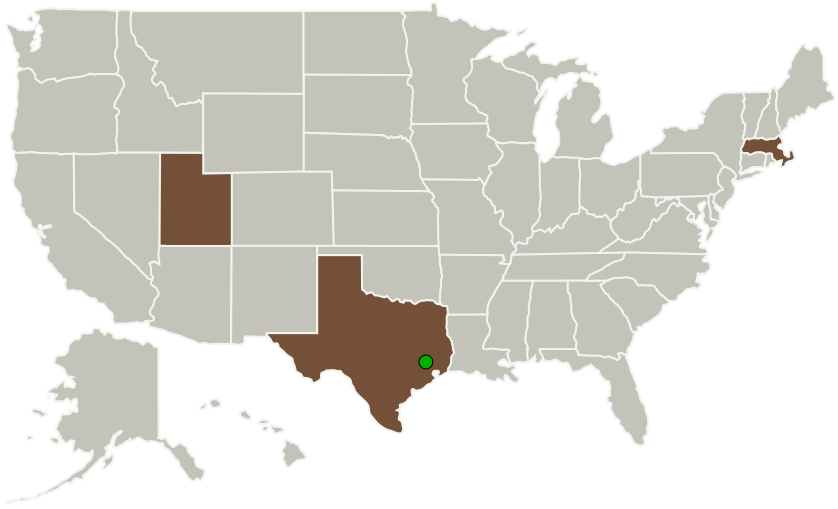
Novel Metal Organic Framework Synthesis for Spacecraft Oxygen Capture, Phase I

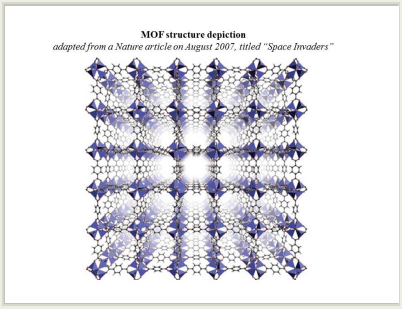
Completed Technology Project (2014 - 2014)

Project Introduction

Busek and University of Utah propose to develop novel metal organic framework (MOF) material to efficiently capture oxygen in spacecraft cabin environment. The proposed novel MOF is postulated to be capable of separating oxygen from ambient air with high efficiency, and at the same time, be stable to moisture and resistant to decomposition. In Phase I, our team shall synthesize the proposed MOF and a MOF of known oxygen capture capability as the benchmark. The MOFs will be tested for their oxygen capture capability, gas selectivity, and reversibility. The effects of water on capture capability will also be examined. The physical measurements will guide the syntheses. At the end of Phase I, a preliminary sub-scale proof of concept will be explored for configuration optimization with relevant air flows. In Phase II, we shall validate the subscale proof-of-concept device and further scale up toward a prototype MOF-based O2 capture system.

Primary U.S. Work Locations and Key Partners





Novel Metal Organic Framework Synthesis for Spacecraft Oxygen Capture Project Image

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Organizations Performing Work	Role	Type	Location
Busek Company, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Natick, Massachusetts
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas
University of Utah	Supporting Organization	Academia	Salt Lake City, Utah

Primary U.S. Work Locations	
Massachusetts	Texas
Utah	

Project Transitions

June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138376)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Busek Company, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

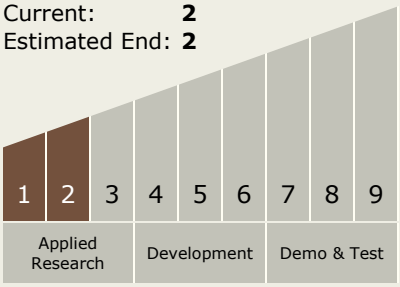
Carlos Torrez

Principal Investigator:

Yu-hui Chiu

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



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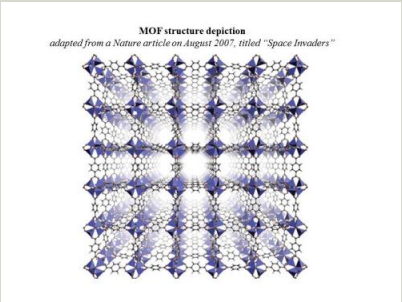
Images



Project Image
Novel Metal Organic Framework Synthesis for Spacecraft Oxygen Capture Project Image
(https://techport.nasa.gov/image/135464)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System